58TMA, 58TUA
Deluxe 2-Speed Gas-Fired
Induced-Combustion Furnace

Service and Maintenance Instructions
For Sizes 040-135, Series 100

NOTE: Read the entire instruction manual before performing any service or maintenance.

This symbol → indicates a change since the last issue.

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SAFETY CONSIDERATIONS

Installing and servicing heating equipment can be hazardous due to gas and electrical components. Only trained and qualified personnel should install, repair, or service heating equipment.

Untrained personnel can perform basic maintenance functions such as cleaning and replacing air filters. All other operations must be performed by trained service personnel. When working on heating equipment, observe precautions in the literature, tags, and labels attached to or shipped with the unit and other safety precautions that may apply.

Follow all safety codes. In the United States, follow all safety codes including the National Fuel Gas Code NFPA No. 54-1992/ANSI Z223.1-1992. In Canada, refer to the current edition of the National Standard of Canada CAN/CGA-B149.1- and .2-M91 Natural Gas and Propane Gas Installation Codes. Wear safety glasses and work gloves. Have fire extinguisher available during start-up and adjustment procedures and service calls.

Recognize safety information. This is the safety-alert symbol ⚠ . When you see this symbol on the furnace and in instructions or manuals, be alert to the potential for personal injury.

Understand the signal words DANGER, WARNING, and CAUTION. These words are used with the safety-alert symbol. DANGER identifies the most serious hazards which **will** result in severe personal injury or death. WARNING signifies a hazard which **could** result in personal injury or death. CAUTION is used to identify unsafe practices which **would** result in minor personal injury or product and property damage.

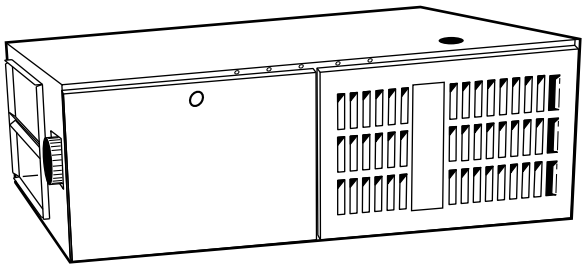

Fig. 1—Model 58TMA Horizontal

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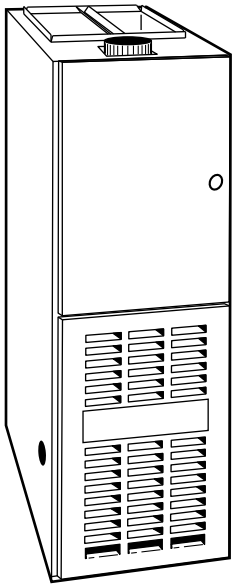

Fig. 2—Model 58TMA Downflow

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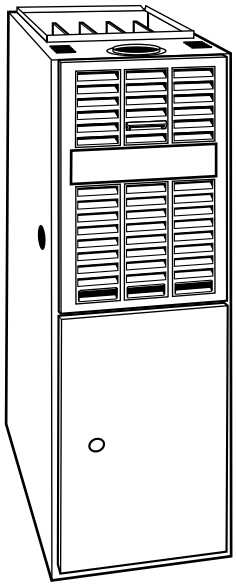

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Fig. 3—Model 58TUA Upflow

Manufacturer reserves the right to discontinue, or change at any time, specifications or designs without notice and without incurring obligations.

⚠ WARNING

The ability to properly perform maintenance on this equipment requires certain expertise, mechanical skills, tools, and equipment. If you do not possess these, do not attempt to perform any maintenance on this equipment other than those procedures recommended in the User's Manual. A FAILURE TO FOLLOW THIS WARNING COULD RESULT IN POSSIBLE DAMAGE TO THIS EQUIPMENT, SERIOUS PERSONAL INJURY, OR DEATH.

ELECTROSTATIC DISCHARGE (ESD) PRECAUTIONS PROCEDURE

⚠ CAUTION

Electrostatic discharge can affect electronic components. Take precautions during furnace installation and servicing to protect the furnace electronic control. Precautions will prevent electrostatic discharges from personnel and hand tools which are held during the procedure. These precautions will help to avoid exposing the control to electrostatic discharge by putting the furnace, the control, and the person at the same electrostatic potential.

1. Disconnect all power to the furnace. DO NOT TOUCH THE CONTROL OR **ANY** WIRE CONNECTED TO THE CONTROL PRIOR TO DISCHARGING YOUR BODY'S ELECTROSTATIC CHARGE TO GROUND.
2. Firmly touch a clean, unpainted, metal surface of the furnace chassis which is close to the control. Tools held in a person's hand during grounding will be satisfactorily discharged.
3. After touching the chassis you may proceed to service the control or connecting wires as long as you do nothing that recharges your body with static electricity (for example; DO NOT move or shuffle your feet, DO NOT touch ungrounded objects, etc.).
4. If you touch ungrounded objects (recharge your body with static electricity), firmly touch furnace again before touching control or wires.
5. Use this procedure for installed and uninstalled (ungrounded) furnaces.
6. Before removing a new control from its container, discharge your body's electrostatic charge to ground to protect the control from damage. If the control is to be installed in a furnace, follow items 1. through 5. before bringing the control or yourself into contact with the furnace. Put all used AND new controls into containers before touching ungrounded objects.
7. An ESD service kit (available from commercial sources) may also be used to prevent ESD damage.

CARE AND MAINTENANCE

For continuing high performance and to minimize possible equipment failure, it is essential that periodic maintenance be performed on this equipment. Consult your local dealer as to the proper frequency of maintenance and the availability of a maintenance contract.

⚠ WARNING

Never store anything on, near, or in contact with the furnace, such as:

1. Spray or aerosol cans, rags, brooms, dust mops, vacuum cleaners, or other cleaning tools.
2. Soap powders, bleaches, waxes or other cleaning compounds, plastic or plastic containers, gasoline, kerosene, cigarette lighter fluid, dry cleaning fluids, or other volatile fluids.
3. Paint thinners and other painting compounds, paper bags or other paper products.

A failure to follow this warning could result in corrosion of the heat exchanger, fire, personal injury, or death.

⚠ WARNING

Turn off the gas and electrical supplies to the unit before performing any maintenance or service on it. Follow the operating instructions on the label attached to the furnace. A failure to follow this warning could result in personal injury.

The minimum maintenance that should be performed on this equipment is as follows:

1. Check and clean air filter each month or more frequently if required. Replace if torn.
2. Check blower motor and wheel for cleanliness each heating and cooling season. Clean and lubricate as necessary.
3. Check electrical connections for tightness and controls for proper operation each heating season. Service as necessary.

⚠ CAUTION

As with any mechanical equipment, personal injury can result from sharp metal edges, etc.; therefore, be careful when removing parts.

AIR FILTER ARRANGEMENT — The air filter arrangement may vary depending on the application. Refer to Table 1 or 2 for filter size information.

Table 1—Downflow/Horizontal Filter Size Information (In.)

FURNACE CASING WIDTH	FILTER SIZE	FILTER TYPE
14-3/16	(2) 14 X 20 X 1	Cleanable
17-1/2	(2) 14 X 20 X 1	Cleanable
21	(2) 16 X 20 X 1	Cleanable
24-1/2	(2) 16 X 20 X 1	Cleanable

Table 2—Upflow Filter Size Information (In.)

FURNACE CASING WIDTH	FILTER SIZE		FILTER TYPE
	Side Return	Bottom Return	
14-3/16	(1) 16 X 25 X 1*	(1) 14 X 25 X 1	Cleanable
17-1/2	(1) 16 X 25 X 1*	(1) 16 X 25 X 1	Cleanable
21	(1) 16 X 25 X 1	(1) 20 X 25 X 1*	Cleanable
24-1/2	(2) 16 X 25 X 1*	(1) 24 X 25 X 1	Cleanable

* Factory provided with the furnace. Filters may be field modified as required by cutting and folding the frame as indicated on the filter.

⚠ WARNING

Never operate unit without a filter or with filter access door removed. A failure to follow this warning could result in fire, personal injury, or death.

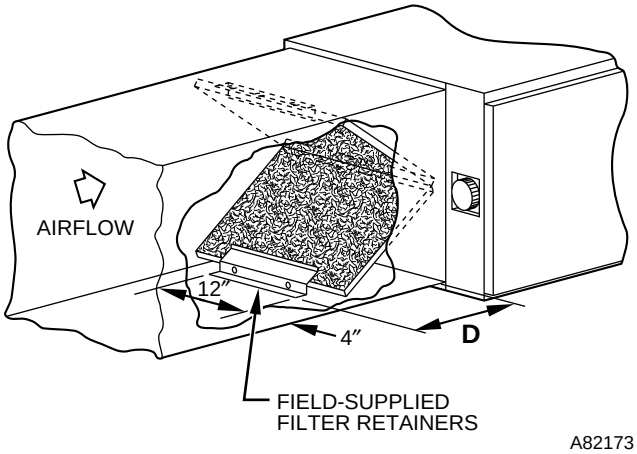

Fig. 4—Horizontal Filter Arrangement

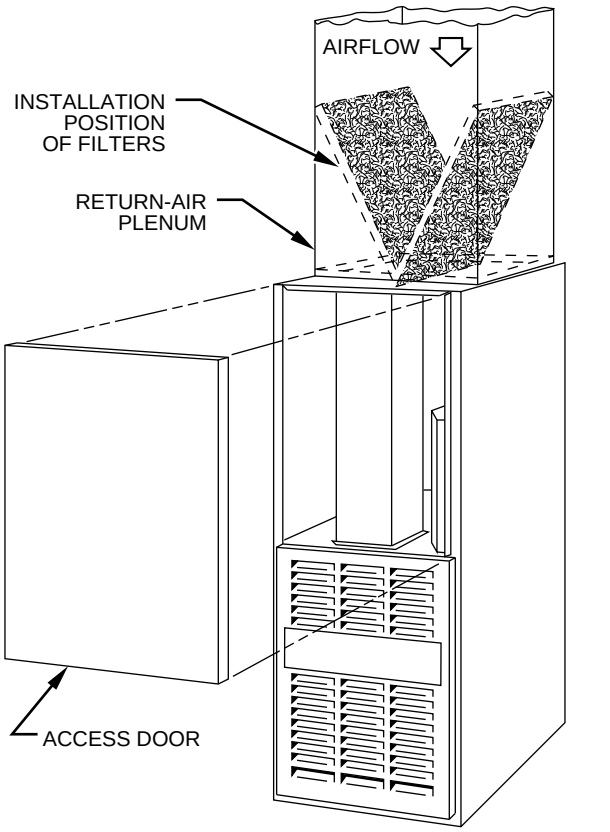

Fig. 5—Downflow Filter Arrangement

1. Horizontal and Downflow.

   Each furnace requires 2 filters which are installed in the return-air duct. (See Fig. 4 and 5.) To remove filters for cleaning or replacement, proceed as follows:

   a. Turn off electrical supply before removing blower access door.

   b. Remove blower access door.

   c. Reach up behind top plate, tilt filters toward center of return-air plenum, remove filters, and clean as needed. Replace if torn.

   d. Furnaces are equipped with permanent, washable filters.

   e. Clean filters by spraying tap water through filter from opposite direction of airflow.

   f. Rinse and let dry. Oiling or coating of filters is not recommended or required.

   g. Reinstall filters.

   h. Replace blower access door and turn on electrical supply to furnace.

2. Upflow.

   Each furnace requires 1 or 2 filters which are installed in the blower compartment. (See Fig. 6.) To remove filters for cleaning or replacement, proceed as follows:

   a. Turn off electrical supply before removing blower and control access doors.

   b. Release filter retainer from clip at front of furnace casing. (See Fig. 6.) For side return, clips may be used on either or both sides of the furnace.

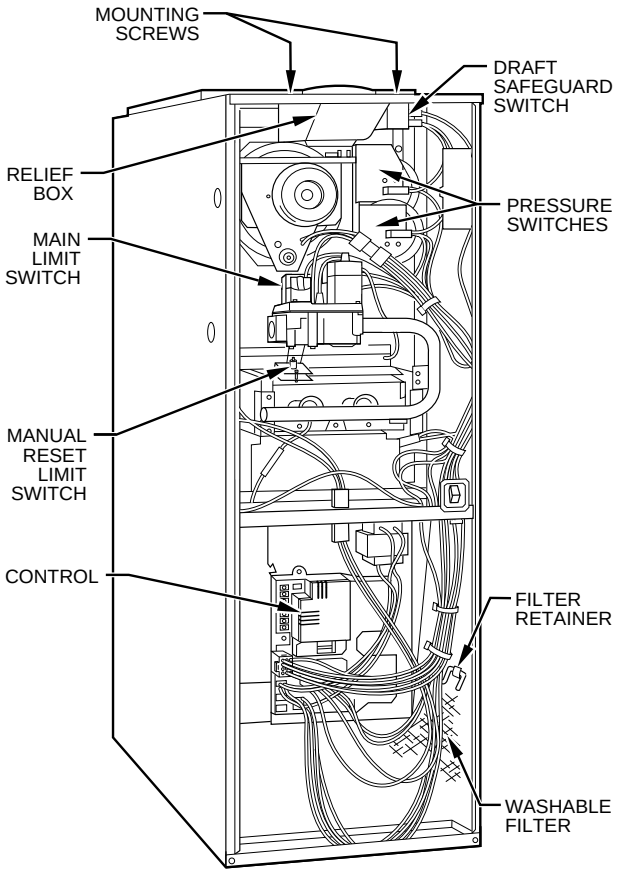

Fig. 6—Model 58TUA Upflow

   c. Slide filter out.

   d. Clean filters by spraying tap water through filter from opposite direction of airflow.

   e. Rinse and let dry. Oiling or coating of filter is not recommended or required.

   f. Place filter in furnace.

   g. Replace blower and control access doors and turn on electrical supply to furnace.

BLOWER MOTOR AND WHEEL — For long life, economy, and high efficiency, clean accumulated dirt and grease from the blower wheel and motor annually.

The following steps should be performed by a qualified service technician:

Some motors have prelubricated sealed bearings and require no lubrication. These motors can be identified by the absence of oil ports on each end of the motor. For those motors with oil ports, lubricate as follows:

Lubricate motor every 5 years if motor is used on intermittent operation (thermostat FAN switch in AUTO position), or every 2 years if motor is in continuous operation (thermostat FAN switch in ON position).

Remember to disconnect the electrical supply before removing access doors.

Clean and lubricate as follows:

1. Remove blower access door.
2. Disconnect vent pipe on downflow/horizontal furnace only.
   a. Remove vent pipe enclosure.
   b. Disconnect vent pipe and remove short piece of pipe from furnace.

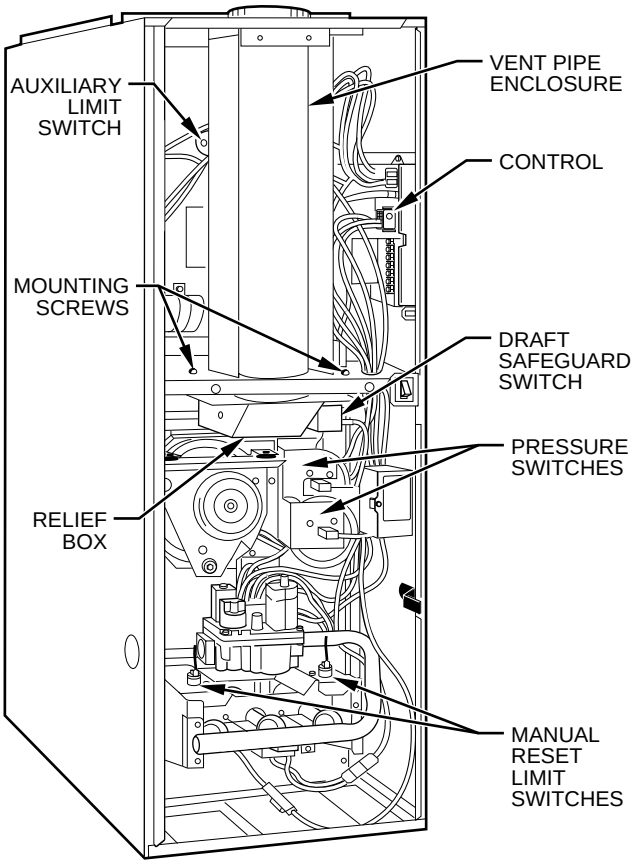

Fig. 7—Model 58TMA Downflow

   c. Disconnect wires from auxiliary limit on blower housing (if present).
3. Disconnect blower electrical leads from control. (See Fig. 6 and 7.) Note location of wires for reassembly.
4. Remove control.
5. Remove screws holding blower assembly to blower deck and slide blower assembly out of furnace.
6. Loosen a screw in strap holding motor capacitor to blower housing and slide capacitor out from under strap.
7. Mark blower wheel, motor, and motor support in relation to blower housing before disassembly to ensure proper reassembly.
8. Loosen setscrew holding blower wheel on motor shaft.
9. Remove bolts holding motor and motor mount to blower housing and slide motor and mount out of housing. Disconnect ground wire attached to blower housing before removing motor.
10. Lubricate motor (when oil ports are provided).
    a. Remove dust caps or plugs from oil ports located at each end of motor.
    b. Use a good grade of SAE 20 nondetergent motor oil and put 1 teaspoon, 5 cc, 3/16 oz, or 16 to 25 drops in each oil port. Do not over-oil.
    c. Allow time for total quantity of oil to be absorbed into each bearing.
    d. After oiling motor, be sure to wipe excess oil from motor housing.
    e. Replace dust cap or plugs on oil ports.
11. Remove blower wheel from housing.
    a. Mark cutoff location to ensure proper reassembly.
    b. Remove screws holding cutoff plate and remove cutoff plate from housing.
    c. Lift blower wheel from housing through opening.
12. Clean blower wheel and motor using a vacuum with soft brush attachment. Do not remove or disturb balance weights (clips) on blower wheel blades. The blower wheel should not be dropped or bent as balance will be affected.
13. Reinstall blower wheel by reversing items 11 a. through c. Be sure wheel is positioned for proper rotation.
14. Reassemble motor and blower by reversing items 5 through 9. If motor has ground wire, be sure it is connected as before.

⚠ CAUTION

Be sure the motor is properly positioned in the blower housing. The motor oil ports must be at a minimum of 45° above the horizontal centerline of the motor after the blower assembly has been reinstalled in the furnace.

15. Reinstall blower assembly in furnace.
16. Reinstall control. (See step C.13 for reassembly of vent pipe and flue enclosure for downflow/horizontal furnaces.)
17. Connect blower electrical leads to control. Please note that connections are polarized for assembly. DO NOT FORCE.

CLEANING HEAT EXCHANGER

The following steps should be performed by a qualified service technician:

NOTE: Deposits of soot and carbon indicate the existence of a problem which needs to be corrected. Take action to correct the problem.

If it becomes necessary to clean the heat exchanger because of carbon deposits, soot, etc., proceed as follows:

1. Turn gas and power to furnace to OFF.
2. Remove control and blower access doors.
3. Remove vent pipe enclosure on downflow/horizontal furnace only and disconnect vent pipe from relief box.
4. Remove 2 screws that secure relief box. (See Fig. 6 or 7.)
5. Disconnect wires to the following components. Mark wires to aid in reconnection of:
   a. Draft safeguard switch.
   b. Inducer motor.
   c. Pressure switch(es).
   d. Limit overtemperature switch(es).
   e. Gas valve.
   f. Hot surface ignitor.

g. Flame-sensing electrode.

h. Wiring connectors leading to control.

6. Remove 8 screws that secure flue collector box to center panel. Be careful not to damage sealant.
7. Remove complete inducer assembly from furnace, exposing flue openings.
8. Using field-provided small wire brush, steel spring cable, reversible electric drill, and vacuum cleaner, clean cells as follows:

   a. Assemble wire brush and steel spring cable.

      (1.) Use 48 in. of 1/4-in. diameter high-grade steel spring cable (commonly known as drain clean-out or Roto-Rooter cable).

      (2.) Use 1/4-in. diameter wire brush (commonly known as 25-caliber rifle cleaning brush).

NOTE: The materials needed in items (1.) and (2.) can usually be purchased at local hardware stores.

      (3.) Insert twisted wire end of brush into end of spring cable, and crimp tight with crimping tool or strike with ball-peen hammer. TIGHTNESS IS VERY IMPORTANT.

      (4.) Remove metal screw fitting from wire brush to allow insertion into cable.

   b. Clean each heat exchanger cell.

      (1.) Attach variable-speed, reversible drill to end of spring cable (end opposite brush).

      (2.) Remove cell outlet plates. IMPORTANT: Replace screws in center panel before cleaning.

      (3.) Insert brush end of cable into upper opening of cell and slowly rotate with drill. DO NOT force cable. Gradually insert at least 36 in. of cable into 2 upper passes of cell. (See Fig. 8.)

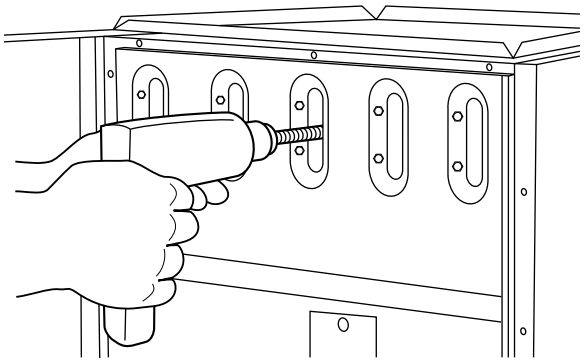

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Fig. 8—Cleaning Heat Exchanger Cell

      (4.) Work cable in and out of cell 3 or 4 times to obtain sufficient cleaning. DO NOT pull cable with great force. Reverse drill and gradually work cable out.

      (5.) Remove burner assembly and cell inlet plates.

NOTE: Be very careful when removing the burner assembly to avoid breaking the ignitor. See Fig. 9 for the correct ignitor location.

      (6.) IMPORTANT: Replace screws in center panel and cells before cleaning.

      (7.) Insert brush end of cable in lower opening of cell, and proceed to clean 2 lower passes of cell in same manner as 2 upper passes.

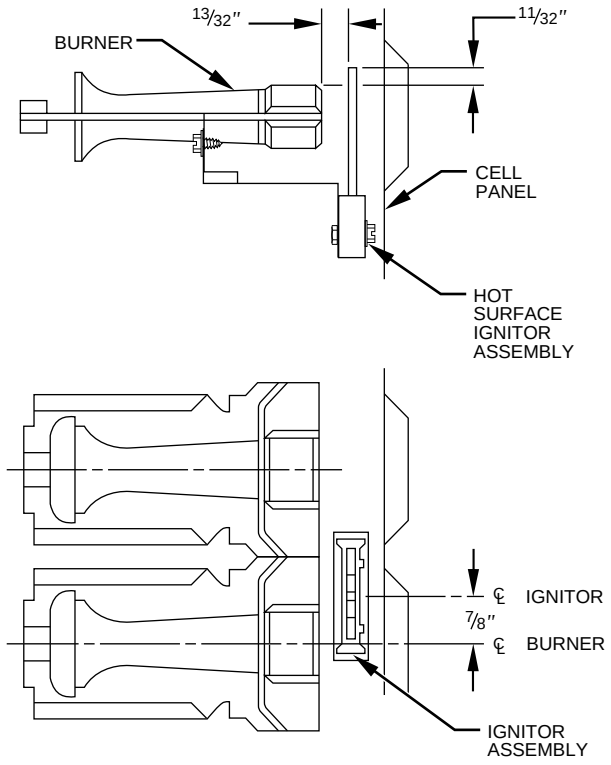

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Fig. 9—Position of Ignitor to Burner

      (8.) Repeat foregoing procedures until each cell in furnace has been cleaned.

      (9.) Using vacuum cleaner, remove residue from each cell.

      (10.) Using vacuum cleaner with soft brush attachment, clean burner assembly.

      (11.) Reinstall cell outlet plates and screws FIRST; then, reinstall cell inlet plates and burner assembly. Care must be exercised to center the burners in the cell openings.

9. After cleaning flue openings, check sealant on flue collector to ensure that it has not been damaged. If new sealant is needed, contact your dealer or distributor.
10. Clean and replace flue collector assembly, making sure all 8 screws are secure.
11. Reinstall relief box.
12. Reconnect wires to the following components:

    a. Draft safeguard switch.

    b. Inducer motor.

    c. Pressure switches.

    d. Limit overtemperature switch(es).

    e. Gas valve.

    f. Hot surface ignitor.

    g. Flame-sensing electrode.

    h. Wiring connectors leading to control.

13. Reconnect vent pipe to relief box. When applicable replace vent pipe enclosure.
14. Replace blower door only.
15. Turn power and gas to ON.
16. Set thermostat and check furnace for proper operation.
17. Verify blower airflow and speed changes between heating and cooling.

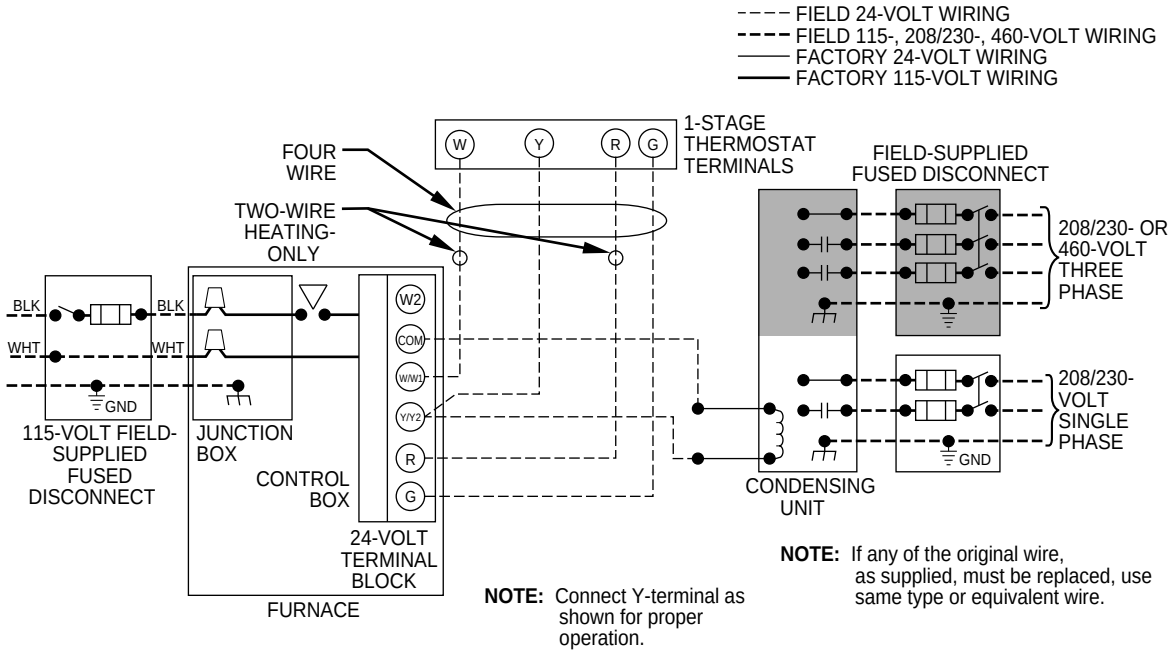

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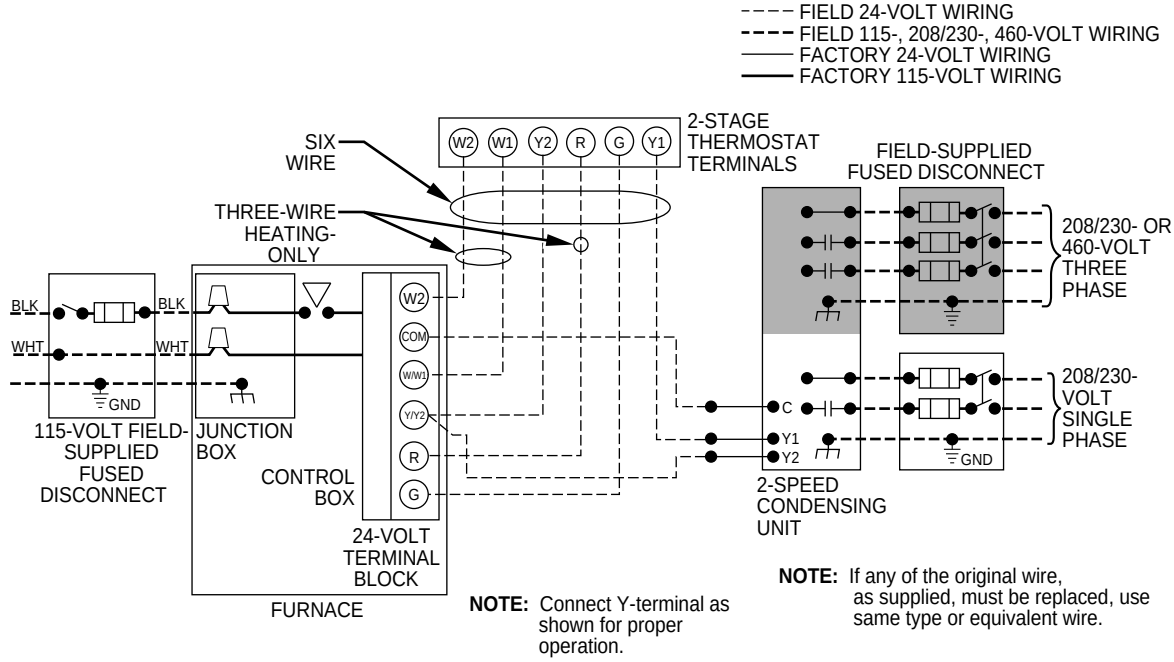
Fig. 10—Heating and Cooling Application Wiring Diagram



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→ **Fig. 11—Heating and Cooling Application Wiring Diagram for 2-Stage Thermostats and/or 2-Speed Condensing Units**

18. Check for gas leaks.
19. Replace control door.

⚠ WARNING

Never use a match or other open flame to check for gas leaks. Use a soap-and-water solution. A failure to follow this warning could result in fire, personal injury, or death.

ELECTRICAL CONTROLS AND WIRING

NOTE: There may be more than 1 electrical supply to unit.

The electrical ground and polarity for 115-v wiring must be maintained properly. Refer to Fig. 10 and 11 for field wiring information and to Fig. 12 for unit wiring information. If the polarity is NOT correct, the furnace control will display code 02 on the status LED and prevent heat operation. The control system also requires an earth ground for proper operation of the microprocessor.

With power disconnected to unit, check all electrical connections for tightness. Tighten all screws on electrical connections. If any smoky or burned connections are noticed, disassemble the connection, clean all parts and stripped wire, and reassemble properly and securely. Electrical controls are difficult to check without proper instrumentation; therefore, reconnect electrical power to unit and observe unit through 1 complete operating cycle.

The 24-v circuit contains an automotive-type, 3-amp fuse located on the main control. Any 24-v electrical shorts during installation, service, or maintenance could cause this fuse to blow. If fuse

replacement is required, use ONLY a 3-amp fuse. The control will display code 24 when the fuse needs replacement.

The control in this furnace is equipped with an LED status light to aid in installation, servicing, and troubleshooting. It can be viewed through the sight glass or window on the blower access door. The control indicates status with the LED on continuously, rapid flashing, or a code composed of 2 digits. (The first digit is the number of short flashes, the second is the number of longs flashes.) Refer to the service label on the blower compartment door for code explanations and useful troubleshooting suggestions. (See Fig. 13.)

It is important to note that the power to the furnace must not be interrupted and the furnace blower door must not be removed until the LED status code(es) is recorded. When power to the control is interrupted, the status memory is erased.

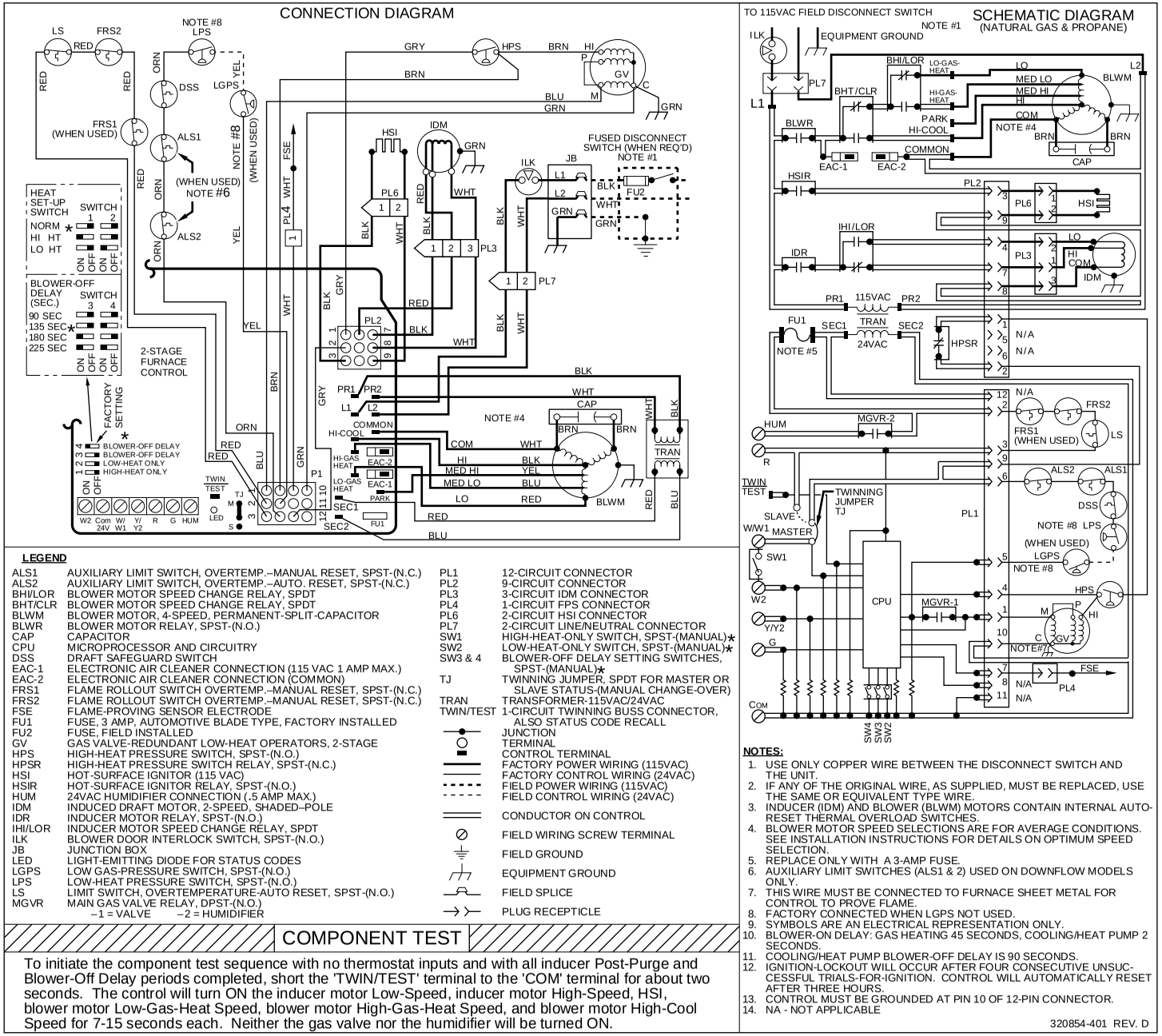
The control will store up to 5 previous codes but will not store non-current code longer than 48 hr. To retrieve previous codes, if present, no thermostat inputs to the control must be present and all time delays must expire. Remove 1 of the red main limit wires 1 to 4 sec until the LED light goes out, then reconnect it. (See Fig. 6 and 7.) (Do not leave red wire disconnected for longer periods of time as the control will assume an overtemperature condition exits and will respond with indoor blower operation.) This places the control in the status recall mode and displays the first code stored in memory. Record the code and repeat the disconnect and reconnect of the red wire, recording each code until code 11 is displayed indicating no additional faults. After the last code is displayed or after 2 minutes in the code, recall mode the control will return to normal standby mode.

Use any recorded fault codes, the service label, and the trouble-shooting diagram on the following pages to diagnose and correct any problem condition.

→ TROUBLESHOOTING

Refer to the service label. (See Fig. 13.) Page 10 contains a troubleshooting guide. This guide can be a useful tool in isolating furnace operation problems. Beginning with the word "Start," answer each question and follow the appropriate arrow to the next item.

The guide will help to identify the problem or failed component. After replacing any component, verify correct operation sequence.



LEGEND

ALS1	AUXILIARY LIMIT SWITCH, OVERTEMP.–MANUAL RESET, SPST-(N.C.)	PL1	12-CIRCUIT CONNECTOR
ALS2	AUXILIARY LIMIT SWITCH, OVERTEMP.–AUTO. RESET, SPST-(N.C.)	PL2	9-CIRCUIT CONNECTOR
BHI/LOR	BLOWER MOTOR SPEED CHANGE RELAY, SPDT	PL3	3-CIRCUIT IDM CONNECTOR
BHT/CLR	BLOWER MOTOR SPEED CHANGE RELAY, SPDT	PL4	1-CIRCUIT FPS CONNECTOR
BLWM	BLOWER MOTOR, 4-SPEED, PERMANENT-SPLIT-CAPACITOR	PL6	2-CIRCUIT HSI CONNECTOR
BLWR	BLOWER MOTOR RELAY, SPST-(N.O.)	PL7	2-CIRCUIT LINE/NEUTRAL CONNECTOR
CAP	CAPACITOR	SW1	HIGH-HEAT-ONLY SWITCH, SPST-(MANUAL)*
CPU	MICROPROCESSOR AND CIRCUITRY	SW2	LOW-HEAT-ONLY SWITCH, SPST-(MANUAL)*
DSS	DRAFT SAFEGUARD SWITCH	SW3 & 4	BLOWER-OFF DELAY SETTING SWITCHES, SPST-(MANUAL)*
EAC-1	ELECTRONIC AIR CLEANER CONNECTION (115 VAC 1 AMP MAX.)	TJ	TWINNING JUMPER, SPDT FOR MASTER OR SLAVE STATUS-(MANUAL CHANGE-OVER)
EAC-2	ELECTRONIC AIR CLEANER CONNECTION (COMMON)	TRAN	TRANSFORMER-115VAC/24VAC
FRS1	FLAME ROLLOUT SWITCH OVERTEMP.–MANUAL RESET, SPST-(N.C.)	TWIN/TEST	1-CIRCUIT TWINNING BUSS CONNECTOR, ALSO STATUS CODE RECALL
FRS2	FLAME ROLLOUT SWITCH OVERTEMP.–MANUAL RESET, SPST-(N.C.)		JUNCTION
FSE	FLAME-PROVING SENSOR ELECTRODE		TERMINAL
FU1	FUSE, 3 AMP, AUTOMOTIVE BLADE TYPE, FACTORY INSTALLED		CONTROL TERMINAL
FU2	FUSE, FIELD INSTALLED		FACTORY POWER WIRING (115VAC)
GV	GAS VALVE-REDUNDANT LOW-HEAT OPERATORS, 2-STAGE		FACTORY CONTROL WIRING (24VAC)
HPS	HIGH-HEAT PRESSURE SWITCH, SPST-(N.O.)		FIELD POWER WIRING (115VAC)
HPSR	HIGH-HEAT PRESSURE SWITCH RELAY, SPST-(N.C.)		FIELD CONTROL WIRING (24VAC)
HSI	HOT-SURFACE IGNITOR (115 VAC)		CONDUCTOR ON CONTROL
HSIR	HOT-SURFACE IGNITOR RELAY, SPST-(N.O.)		FIELD WIRING SCREW TERMINAL
HUM	24VAC HUMIDIFIER CONNECTION (.5 AMP MAX.)		FIELD GROUND
IDM	INDUCED DRAFT MOTOR, 2-SPEED, SHADED–POLE		EQUIPMENT GROUND
IDR	INDUCER MOTOR RELAY, SPST-(N.O.)		FIELD SPLICE
IHI/LOR	INDUCER MOTOR SPEED CHANGE RELAY, SPDT		PLUG RECEPTICLE
ILK	BLOWER DOOR INTERLOCK SWITCH, SPST-(N.O.)		
JB	JUNCTION BOX		
LED	LIGHT-EMITTING DIODE FOR STATUS CODES		
LGPS	LOW GAS-PRESSURE SWITCH, SPST-(N.O.)		
LPS	LOW-HEAT PRESSURE SWITCH, SPST-(N.O.)		
LS	LIMIT SWITCH, OVERTEMPERATURE-AUTO RESET, SPST-(N.O.)		
MGVR	MAIN GAS VALVE RELAY, DPST-(N.O.) –1 = VALVE –2 = HUMIDIFIER		

COMPONENT TEST

To initiate the component test sequence with no thermostat inputs and with all inducer Post-Purge and Blower-Off Delay periods completed, short the 'TWIN/TEST' terminal to the 'COM' terminal for about two seconds. The control will turn ON the inducer motor Low-Speed, inducer motor High-Speed, HSI, blower motor Low-Gas-Heat Speed, blower motor High-Gas-Heat Speed, and blower motor High-Cool Speed for 7-15 seconds each. Neither the gas valve nor the humidifier will be turned ON.

NOTES:

1. USE ONLY COPPER WIRE BETWEEN THE DISCONNECT SWITCH AND THE UNIT.
2. IF ANY OF THE ORIGINAL WIRE, AS SUPPLIED, MUST BE REPLACED, USE THE SAME OR EQUIVALENT TYPE WIRE.
3. INDUCER (IDM) AND BLOWER (BLWM) MOTORS CONTAIN INTERNAL AUTO-RESET THERMAL OVERLOAD SWITCHES.
4. BLOWER MOTOR SPEED SELECTIONS ARE FOR AVERAGE CONDITIONS. SEE INSTALLATION INSTRUCTIONS FOR DETAILS ON OPTIMUM SPEED SELECTION.
5. REPLACE ONLY WITH A 3-AMP FUSE.
6. AUXILIARY LIMIT SWITCHES (ALS1 & 2) USED ON DOWNFLOW MODELS ONLY.
7. THIS WIRE MUST BE CONNECTED TO FURNACE SHEET METAL FOR CONTROL TO PROVE FLAME.
8. FACTORY CONNECTED WHEN LGPS NOT USED.
9. SYMBOLS ARE AN ELECTRICAL REPRESENTATION ONLY.
10. BLOWER-ON DELAY: GAS HEATING 45 SECONDS, COOLING/HEAT PUMP 2 SECONDS.
11. COOLING/HEAT PUMP BLOWER-OFF DELAY IS 90 SECONDS.
12. IGNITION-LOCKOUT WILL OCCUR AFTER FOUR CONSECUTIVE UNSUCCESSFUL TRIALS-FOR-IGNITION. CONTROL WILL AUTOMATICALLY RESET AFTER THREE HOURS.
13. CONTROL MUST BE GROUNDED AT PIN 10 OF 12-PIN CONNECTOR.
14. NA - NOT APPLICABLE

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Fig. 12—Unit Wiring Diagram

⚠ WARNING

Service should be performed only by qualified persons.

SERVICE

If status code recall is needed, do not remove power or blower door.

LED CODE	STATUS
CONTINUOUS OFF	Check for 115V at L1 and L2, and 24V at SEC1 and SEC2**.**
CONTINUOUS ON	Control has 24V power.
RAPID FLASHING	Line voltage polarity reversed. If twinned, 24V power to one furnace may be out of phase with power to other furnace.

EACH OF THE FOLLOWING STATUS CODES IS A TWO-DIGIT NUMBER WITH THE FIRST DIGIT DETERMINED BY THE NUMBER OF SHORT FLASHES AND THE SECOND DIGIT BY THE NUMBER OF LONG FLASHES.

11 **NO PREVIOUS CODE -** Stored status codes are erased when power (115V or 24V) to control is interrupted or 48 hours after each fault is cleared.

12 **BLOWER ON AFTER POWER UP -** Blower runs for 90 seconds, if unit is powered up during a call for heat (R-W/W1 closed). Note: 2-sec. ON-delay.

13 **LIMIT OR FLAME ROLL-OUT (FRS) SWITCH LOCKOUT -** Auto-reset after three hours. FRS switch requires manual-reset.
Check for: - Refer to #33

14 **IGNITION LOCKOUT -** Control will auto-reset after three hours. Refer to #34.

21 **GAS HEATING LOCKOUT -** Control will NOT auto-reset.
Check for: - Mis-wired gas valve - Defective control (valve relay)

22 **ABNORMAL FLAME-PROVING SIGNAL -** Flame is proved while gas valve is de-energized. Inducer will run until fault is cleared.
Check for: - Leaky gas valve - Stuck-open gas valve

23 **LOW- OR HIGH-HEAT PRESSURE SWITCH DID NOT OPEN**
Check for: - Obstructed pressure tubing
- Defective pressure switch (stuck closed)

24 **SECONDARY VOLTAGE FUSE IS OPEN**
Check for: - Short-circuit in secondary voltage (24V) wiring

31 **HIGH-HEAT PRESSURE SWITCH OR RELAY DID NOT CLOSE OR REOPENED**
Check for: -Control relay may be defective - Refer to #**32**

32 **LOW-HEAT PRESSURE, DRAFT SAFEGUARD , OR AUX-LIMIT (DOWNFLOW ONLY*) SWITCH DID NOT CLOSE OR REOPENED**
Check for: - Proper vent sizing (and condensate pitch with side-wall vent)
- Low inducer voltage (115v) * Blower motor and capacitor
- Defective inducer motor - Defective pressure switch
- Excessive wind - Restricted vent
- Inadequate combustion air supply
- Disconnected or obstructed pressure tubing

33 **LIMIT OR FLAME ROLL-OUT (FRS) SWITCH IS OPEN -** FRS switch requires manual-reset.
Check for: - Inadequate combustion air supply (FRS switch only)
- Dirty filter or restricted duct system - Loose blower wheel
- Defective switch or connections
- Blower motor or capacitor failure

34 **IGNITION-PROVING FAULT -** Control will retry three times before lockout #14.
Check for: - Oxide buildup on flame-proving sensor (clean with fine sandpaper).
- Proper flame-proving microamps (0.5 minimum)
- Proper control ground continuity
- Flame-proving sensor must be ungrounded
- Smooth flame carryover and ignition - Manual valve(s) OFF

43 **LOW-HEAT PRESSURE, DRAFT SAFEGUARD, OR AUXILIARY LIMIT SWITCH OPEN WHILE HIGH-HEAT PRESSURE SWITCH IS CLOSED**
Check for: - Disconnected or obstructed pressure tubing
- Defective pressure switch (stuck open)
- Refer to #32 and #33

45 **REPLACE CONTROL**

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Fig. 13—Service Label

TROUBLESHOOTING GUIDE

NOTES:
1. Refer to information label on blower compartment door for procedure for use of LED status codes and problem solving suggestions.
2. LED indicator is viewed through window on blower compartment door.
3. If 115-vac power is energized or interrupted during a call for heat, the indoor blower will run for 90 sec before a gas heating cycle begins – **Code 12**.
4. After replacing any component, verify correct operating sequence.

⚠ WARNING

ELECTRICAL SHOCK HAZARD

ONLY QUALIFIED AND TRAINED SERVICE PERSONNEL SHOULD PERFORM THIS PROCEDURE

START

Turn thermostat **OFF**.

On furnace control, note current settings for setup switches 1 (SW-1) and 2 (SW-2) then set SW-1 to **OFF** and SW-2 to **ON**.

Cycle 115-v power off for 3 sec, then on.

Continuous LED?

- No → • If LED is flashing rapidly, check line voltage polarity.
  • If **Code 24** is displayed, check for blown fuse.
  • If LED is **OFF**, check line voltage and 24-v transformer.
  • If **Code 45** is displayed, replace control.
- Yes ↓

Set thermostat to call for heat. Set **FAN** switch to **AUTO**.

Draft inducer motor starts.

- No → • If **Code 23** is displayed, the pressure switch(es) is stuck closed. Replace switch and/or check pressure tube for blockage.
  • System malfunction – **Code 21.**
- Yes ↓

Is **Code 22** displayed?

- No → • If **Code 32** is displayed check for:
  1. Open gas inlet pressure switch (when used).
  2. Open pressure switch (LPS) and/or tube – **Code 32.**
  3. Open draft safeguard switch (DSS) – **Code 32.**
  4. Open auxiliary switch (ALS)(downflow/horizontal only) – **Code 32.**
  5. Check all low-voltage wiring connections.

  • 115v should be present at the ignitor. If so, replace the ignitor; if not, check 115-vac wiring to ignitor.
  • LPS, DSS, or ALS open while HPS if closed (high-gas-heat only) – **Code 43.**
- Yes ↓

Flame present when not normal. Replace gas valve.

15-sec inducer pre-purge.

Ignitor warms up and glows orange/yellow; 17-sec warm-up.

- No → Control will attempt to light burners 4 times (approximately 1 minute between attempts – **Code 34**). Voltage is present at the gas valve for 7 sec during each ignition trial. System will lockout after 4 attempts.
  • Is the gas valve control knob in the **OPEN** or **ON** position?
  • 24v should be present across the gas valve terminals **C** and **M/P** (and **C** and **HI** for high-fire test) during the 7 sec ignition trial. If not, check all low-voltage wiring connections to valve.
  • If 24v are present, and main gas does not flow:
  1. Supply pressure > 13.6-in. wc.
  2. Replace gas valve.

  • Check ignitor position.
  • Check burner carryover gap.
  • Check gas supply pressure (4.5-in. wc minimum).
  • Check manifold pressure (1.3- to 1.7-in. wc for low-fire; 3.2- to 3.8-in. wc for high fire).
  • Check for proper orifice size.
- Yes ↓

Main burners ignite.

- No → Is **Code 31** (high-gas-heat only), **32, 33, or 34** displayed? Check code information label to diagnose.
  • Check polarity of 115-v power at J-box and control. Twinned furnace polarities must match – rapid flashing **LED**.
  • Check ground continutity from J-box to control.
  • Check flame sensor microamps (4.0 nominal; 0.5 minimum for control to recognize flame).
- Yes ↓

Main burners stay on.

- No → • 115v should be present at the blower motor. If so, check capacitor. If capacitor is OK, replace blower motor. If 115v are not present at the blower motor, check all 115-v wiring to motor.
- Yes ↓

Indoor blower motor starts on heating speed after 45-sec warm-up period.

- No → • If not, check for:
  1. Satisfied thermostat.
  2. Open inlet gas pressure switch (when used).
  3. Open pressure switch (LPS) – **Code 32**.
  4. Open draft safeguard switch (DSS) – **Code 32**.
  5. Open auxilliary limit (ALS)(downflow/horizontal only) – **Code 32**.
  6. Open 24-v fuse (FU1) – **Code 24**.
  7. Open limit switch (LS) – **Code 13** or **33**.
  8. Open flame rollout switch (FRS) – **Code 13** or **33**.
  9. Check 115-v line voltage – **LED** off.

  Check for sources of electrical noise interference (electronic air cleaners, nearby TV, or radio antennas).
- Yes ↓

Furnace runs until call for heat ends.

- No → • If inducer and burners continue to operate, check for 24v at the gas valve. If 24v are present, verify that the thermostat is open across R and W. If no voltage is present, turn the gas valve control knob to the **OFF** position. Replace gas valve.
- Yes ↓

Turn thermostat to **OFF**; gas valve shuts off burners; 5-sec inducer post purge.

- No → • 24v should be present across R and C. If not, check for:
  1. Open limit switch (LS) – **Code 13 or 33**.
  2. Open flame rollout switch (FRS) – **Code 13 or 33**.

  • 24v should not be present across R and G. If so, turn thermostat **FAN** switch to **AUTO**.
- Yes ↓

Indoor blower motor stops after 90, 135, 180, or 225 sec.

- No → Is indoor blower on ?
  - Yes → • 24v should be present across R and C. If not, check for:
    1. Open flame rollout switch (FRS) – **Code 33**.
    2. Open limit switch (LS) – **Code 33.**
    3. Check all low-voltage wiring connections.

    No ↓ Replace control only if all checks are OK.
  - No ↓ • 24v should be present across C and W. If not, check for:
    1. Open thermostat.
    2. Open 24-v fuse (FU1) – **Code 24.**
    3. Failed transformer.

    • 115v should be present at the inducer motor. If so, replace inducer motor. If not, check 115-v wiring.
- Yes ↓

Heating sequence of operation complete. Remove blower door, move setup switch 1 (SW-1) to **ON** position and repeat process to check high-fire operation. (When finished return SW-1 and SW-2 to original desired settings.)

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